

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)


Applicant's or agent's file reference 03R00342/PC	FOR FURTHER ACTION		See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416)
International application No. PCT/JP 03/08935	International filing date (day/month/year) 14.07.2003	Priority date (day/month/year) 16.07.2002	
International Patent Classification (IPC) or both national classification and IPC G09G5/24			
Applicant SHARP KABUSHIKI KAISHA et al.			

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 14 sheets, including this cover sheet.

☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

 These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:
 - I ☒ Basis of the opinion
 - II ☐ Priority
 - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
 - IV ☒ Lack of unity of invention
 - V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
 - VI ☐ Certain documents cited
 - VII ☐ Certain defects in the international application
 - VIII ☐ Certain observations on the international application

Date of submission of the demand 12.02.2004	Date of completion of this report 04.11.2004
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**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. **PCT/JP 03/08935**

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, Pages

1-82 as originally filed

Claims, Numbers

1-41 as originally filed

Drawings, Sheets

1/14-14/14 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
☐ the language of publication of the international application (under Rule 48.3(b)).
☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority in written form.
☐ furnished subsequently to this Authority in computer readable form.
☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
☐ the claims, Nos.:
☐ the drawings, sheets:

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/JP 03/08935

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

IV. Lack of unity of invention

1. In response to the invitation to restrict or pay additional fees, the applicant has:

- ☐ restricted the claims.
☒ paid additional fees.
☐ paid additional fees under protest.
☐ neither restricted nor paid additional fees.

2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is

- ☐ complied with.
☐ not complied with for the following reasons:

4. Consequently, the following parts of the international application were the subject of international preliminary examination in establishing this report:

- ☒ all parts.
☐ the parts relating to claims Nos. .

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-41
	No: Claims	
Inventive step (IS)	Yes: Claims	
	No: Claims	1-41
Industrial applicability (IA)	Yes: Claims	1-41
	No: Claims	

2. Citations and explanations

see separate sheet

Re Item IV

Lack of unity of invention

1.1 This Authority considers that there are two inventions covered by the claims indicated as follows:

- I: Claims 1-13 and 16-23 directed to a display apparatus in which the control section sets the luminance level of the basic portion and the luminance of the neighbouring portion in accordance with the intensity of light for irradiating the display screen
- II: Claims 14, 15 and 24-41 directed to a display apparatus in which the control section sets the luminance level of the basic portion and the luminance of the neighbouring portion in accordance with information related to a viewer of the display device.

1.2 The reasons for which the inventions are not so linked as to form a single general inventive concept, as required by Rule 13.1 PCT, are as follows:

The prior art has been identified as document EP 1158485 (- hereinafter D1) and discloses (- cf. independent claims 1 and 24):

A display device (- 3 - Fig. 8d) including a display screen for displaying characters and/or graphics, wherein each of the characters and/or graphics contains a basic portion (- bits with "1" or "0" - Figs. 13A-16D and para. [0150]) and a neighbouring portion (- bits with "*" - Figs. 13A-16D and para. [0150]) arranged in the vicinity of the basic portion; and

a control section (- 20, 40 - Fig. 8D) for controlling the display device, wherein the control section sets a luminance level of the basic portion and a luminance level of the neighbouring portion (- "brightness table generation program 6b" - Fig. 8D), and

the control section controls the display device so that the character and/or graphics are displayed on the display screen (- graphic displaying procedure - Fig. 10) using the set luminance level of the neighbouring portion.

- 1.3 It follows that the following technical features of claims 1 and 24 make a contribution over the prior art and can be considered as special technical features within the meaning of Rule 13.2 PCT:

Claim 1 -

the control section sets the luminance level of the basic portion and the luminance level of the neighbouring portion in accordance with the intensity of light for irradiating the display screen;

Claim 24 -

the control section sets the luminance level of the basic portion and the luminance level of the neighbouring portion in accordance with information related to a viewer of the display device.

- 1.4 The problem solved by these special technical features can therefore be construed as:

Claim 1 -

overcoming different display characteristics of e.g. a liquid crystal display device which occur depending upon whether the display is in a transmission mode, i.e. in which a backlight is active, or a reflection mode, i.e. in which illumination is provided by reflection of ambient light;

Claim 24 -

overcoming different problems a viewer may have depending upon whether the viewer suffers from e.g. colour blindness or cataracts, or providing the viewer with different display paradigms, irrespective of whether the display device is e.g. in a transmission mode or a reflection mode.

- 1.4a Also, examining the possible correspondence by technical effect, one finds that the technical effect of the first invention is to:

i) prevent the occurrence of colour noise; and

ii) prevent the apparent change in thickness of graphics and/or characters

due to a change in the state of illumination of the display

and that the technical effect of the second invention is to:

provide correction patterns which enable a viewer, having vision problems, to better interpret data which is presented on the screen of the display device.

This appears to show lack of corresponding technical effect as well.

Consequently, neither the objective problem underlying the subjects of the claimed inventions, nor their solutions defined by the special technical features allow for a relationship to be established between the said inventions, which involves a single general inventive concept.

- 1.5 In conclusion, the groups of claims are not linked by common or corresponding special technical features and define two different inventions not linked by a single general inventive concept.

The application, hence does not meet the requirements of unity of invention as defined in Rules 13.1 and 13.2 PCT.

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Reference is made to the following documents:
 - D1: EP-A-1 158 485 (SHARP KK) 28 November 2001 (2001-11-28)
 - D2: EP-A-0 883 103 (THOMSON MULTIMEDIA SA) 9 December 1998 (1998-12-09)
 - D3: EP-A-0 907 158 (SHARP KK) 7 April 1999 (1999-04-07)
 - D4: US-A-5 475 399 (BORSUK SHERWIN M) 12 December 1995 (1995-12-12)
 - D5: WINKLER R ET AL: "READABILITY OF ELECTRONIC DISPLAYS" PROCEEDINGS OF THE SID, SOCIETY FOR INFORMATION DISPLAY. PLAYA DEL REY, CA, US, vol. 21, no. 4, 1980, pages 309-313, XP009020838
2. The first invention of the present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claims 1-13 and 16-23 does not involve an inventive step in the sense of Article 33(3) PCT.
 - 2.1 The document **D1** is regarded as being the closest prior art and discloses (- cf. independent claims 1 and 16) a display apparatus comprising:
 - a display device (- 3 - Fig. 8d) including a display screen (- Figs. 1-4) for displaying characters and/or graphics, wherein each of the characters and/or graphics contains a basic portion (- Level 3 - Figs. 1-4; bits "1" or "0" - Figs. 13A-16D and para. [0150]) and a neighbouring portion (- Levels 1, 2 - Figs. 1-4; bits with "*" - Figs. 13A-16D and para. [0150]) arranged in the vicinity of the basic portion; and
 - a control section (- 20, 40 - Fig. 8d) for controlling the display device; wherein the control section sets a luminance level of the neighbouring level of the basic portion and a luminance level of neighbouring portion (- "brightness table generation program 6b" - Fig. 8d and individual levels of R,G,B - Fig. 5); and
 - the control section controls the display device so that the character and/or graphics are displayed on the display screen (- graphic displaying procedure - Fig. 10) using the set luminance of the basic portion and the set luminance level of the neighbouring portion.

- 2.1a The subject-matter of claim 1 therefore differs from that known from D1 in that:
the control section controls the display device in accordance with the intensity of
light for irradiating the display screen.

The problem to be solved by the present invention may therefore be regarded as
maintaining the visibility and/or colour balance of the image displayed on the
display screen in accordance with the intensity of ambient light or light from a
backlight.

- 2.1b The solution proposed in claim 1 of the present application cannot be considered
as involving an inventive step (Article 33(3) PCT) for the following reasons.

D2, in common with D1 discloses corresponding features of:

a display device (- panel 10 - Figs. 2-4); and

a control section (- 32, 42 and 34 - Figs. 2-4 and "circuit 34 for controlling colours"
- col. 2, line 48).

- 2.1c In addition, D2 Furthermore discloses:
the control section controls the display device in accordance with the intensity of
light for irradiating the display screen
(- "The tables in the circuit 32 or 42 provide a correction which maintains the
colors when the intensity of ambient light or the intensity of the back source
is changing. " - col. 3, lines 43-46).

As such therefore, the respective subject matters of the apparatus of independent
claim 1 and the method of independent claim 16 are considered to comprise no
more than:

- i) the application of a technique, known from D2, of maintaining the colour
balance of images displayed on an LCD in accordance with the intensity of
light from the environment, i.e. ambient light, or light from a backlight,
- ii) in a LCD, known from D1, in which characters and/or graphics, consisting of
colour sub-pixels, comprise a basic portion and a neighbouring portion.

Accordingly, in light of PCT-Guidelines IV, Chapter IV-8.8, A1(v), the respective
subject matters of independent claim 1 and 16 are not considered to involve an
inventive step over a non-inventive combination of the teachings of D1 and D2
within the meaning of Article 33(3) PCT.

2.2 In addition (- cf. independent claims 22 and 23), insofar as it is well known in the art to employ LCDs as a display monitor of a computer, any said such computer employing:

- a program for displaying characters and/or graphics; and
- a recording medium, storing such a program,

the respective subject matters of independent claims 22 and 23 are also not considered to involve an inventive step over a non-inventive combination of the teachings of D1 and D2 within the meaning of Article 33(3) PCT.

2.3 In respect of the dependent claims:

2.3a It is submitted that the natural consequence of (- cf. dependent claim 2 and 17):

- i) applying the correction of the technique known from D2 in
- ii) a display known from D1,

is that at least one of the luminance level of the basic portion and the luminance level of the neighbouring portion will be corrected (- col. 3, lines 43-46) in accordance with the intensity of light for irradiating the display screen.

Accordingly, the respective subject matters of dependent claim 2 and 17 are not considered to involve an inventive step over a non-inventive combination of the teachings of D1 and D2 within the meaning of Article 33(3) PCT.

2.3b Furthermore, D1 also discloses (- cf. dependent claim 3 and 18)

- the luminance level of the neighbouring portion is changed stepwise with an increase in a distance from the basic portion
(- levels 1, 2 - Figs. 1-4, and "correction pattern (5321)" - Fig. 25C and para. [0195])

Accordingly, the respective subject matters of dependent claims 3 and 18 are also not considered to involve an inventive step over a non-inventive combination of the teachings of D1 and D2 within the meaning of Article 33(3) PCT.

2.3c In addition, both D1 and D2 further disclose (- cf. dependent claims 4,5 and 19, 20):

- a plurality of colour elements
(D1 - R, G, B - Figs. 1-7 and 13B);
(D2 - "controlling the [RGB] colors [...] of panel 34" - col. 2, lines 48, 49 and 54);
- each of the plurality of pixels comprises a plurality of sub-pixels, each of the

plurality of subpixels is associated with one of a plurality of color elements
(D1 - Figs. 1-7 and 13B),

(D2 - implicit insofar as D2 discloses the use of "a [single] light source 16" -
Figs. 2-4 and col. 2, lines 33-34, and "provides the color signals R, G, and B
to the panel 10" - col. 2, lines 54, 55).

D1 also discloses (- cf. dependent claim 6):

- the basic portion and the neighbouring portion are assigned the plurality of subpixels (- Figs. 1-4).

Accordingly, the respective subject matters of dependent claims 4-6 and 19, 20 are also not considered to involve an inventive step over a non-inventive combination of the teachings of D1 and D2 within the meaning of Article 33(3) PCT.

2.3d D2 further discloses (- cf. dependent claims 7-9, 13 and 21):

- a light irradiation section (- light source 16 - Figs. 1-4); and
- the control section (- 22, 32, 42, 34 - Figs. 2-4) sets the luminance level of [characters and/or graphics] in accordance with:
 - the intensity of light to be emitted
 - (- intensity control circuit 22 controls signals to circuit 34 for controlling the colours via interface circuit 32, 42 - Figs. 2-4 and see col. 2, lines 44-49)
 - on or off state of the light irradiation section
 - (- implicit that if no power is supplied to the intensity control circuit 22, then no signals will be sent to said interface 32)
 - an irradiation level(- outputs 32₁, 32₂, 32₃ - Fig. 2 and col. 2, lines 44-49)
 - indicating the intensity of light to be emitted from the light irradiation section to the display.

Accordingly, the respective subject matters of dependent claims 7-9, 13 and 21 are also not considered to involve an inventive step over a non-inventive combination of the teachings of D1 and D2 within the meaning of Article 33(3) PCT.

2.3e Furthermore (- cf. dependent claims 11 and 12), both D1 and D2 each disclose respective memory tables:

(D1 - "correction pattern tables 5b" of Auxiliary storage 40 - Figs. 8A-8D)

(D2 - "Interface circuits 32 and 42 comprise a memory of the ROM type in which data are stored as tables corresponding to curves. More precisely the

signal at the input 30, or 421, is, inside circuit 32 or 42, divided into a given number of value ranges. To each range corresponds a set of three curves gamma R, gamma G and gamma B. " - col. 3, lines 27-32).

Accordingly, the respective subject matters of dependent claims 11 and 12 are also not considered to involve an inventive step over a non-inventive combination of the teachings of D1 and D2 within the meaning of Article 33(3) PCT.

- 2.4 In common with D1, D3 discloses (- cf. independent claim 1 and dependent claim 10) a display apparatus comprising:
- a display device (- 1 - Fig. 1 and Figs. 6A-6D);
 - a control section (- 5,8 - Fig. 3); and
 - a light irradiation section disposed at a rear of the display medium (- 3 - Fig. 3; NB while D1 does not explicitly disclose the use of a backlight, insofar as D1 discloses the display apparatus comprises "a transmission type [LCD]" (- para. [0112], lines 4,5) this is considered to be implicitly disclosed by D1).

In addition, D3 further discloses that said control section

- sets a luminance level of [characters and/or graphics] in accordance with the intensity of light for irradiating the display screen
 - (- "Character Size" - Fig. 7;
 - "The display control section changes a display configuration of the data to be displayed on the display panel when the illumination instruction section outputs the backlight illumination instruction" - para. [0018], last four lines, wherein an increased character size is considered to provide a corresponding increase in luminance; and
 - "display[s] the data stored in the display buffer in reverse video [in response to a backlight illumination instruction]" - para. [0027]).

- 2.4a It is acknowledged that while D1 discloses both reflection type LCDs and transmission type LCDs, D1 fails to disclose a LCD comprising both:
- a display medium and a reflection section; and
 - a light irradiation section disclosed at a rear of the display medium,
- nor does D1 disclose the control section along the lines of that mentioned in the last two paragraphs of dependent claim 10.

- 2.4b As such therefore, the problem to be solved by the invention as claimed in respect of dependent claim 10 may therefore be regarded as that of improving the visibility

of a reflection type display when the ambient light from the environment is insufficient.

However (- cf dependent claim 10), D3 which also discloses the display apparatus disclosed therein as comprising:

- a display medium (- 2 - Fig. 2) and a reflection section (- reflector 2a - Fig. 2 and para. [0043]).

Furthermore also discloses said display apparatus as also comprising (- cf. last two paragraphs of dependent claim 10):

- the control section switches between a transmission mode (- "Is Backlight key Actuated", S27, S28 - Fig. 5) in which light to be emitted from the light irradiation section is transmitted through the display medium (- Figs. 6B, 6C) when the light irradiation section is on, and a reflection mode (- "Backlight is Turned Off", S32 - Fig. 5) in which light incident from a front of the display medium and transmitted through the display medium is reflected by the reflection section (- Fig. 6A) when the light irradiation section is off; and
- the control section sets the luminance level of [characters and/or graphics] in accordance with the transmission mode or the reflection mode (- "Display of Characters is returned to Initial State", S34 and "Display is Switched to Reverse Video", S28 - Fig. 5).

Accordingly, in light of PCT-Guidelines IV, Chapter IV-8.8, A1(v), the subject matter of dependent claim 10 is not considered to involve an inventive step over a non-inventive combination of the teachings of D1 and D3 within the meaning of Article 33(3) PCT.

3. The second invention of the present application does not meet the criteria of Article 33(1) PCT because the subject-matter of claims 24-41 and claims 14, 15 (dependent upon claim 1 does not involve an inventive step in the sense of Article 33(3) PCT.
- 3.1 The document **D1** is regarded as being the closest prior art and discloses (- cf. independent claims 24 and 33) a display apparatus comprising:
 - a display device (- 3 - Fig. 8d) including a display screen (- Figs. 1-4) for displaying characters and/or graphics, wherein each of the characters and /or graphics contains a basic portion (- Level 3 - Figs. 1-4; bits "1" or "0" - Figs. 13A-16D and para. [0150]) and a neighbouring portion (- Levels 1, 2 - Figs. 1-4; bits with

"*" - Figs. 13A-16D and para. [0150]) arranged in the vicinity of the basic portion; and
a control section (- 20, 40 - Fig. 8d) for controlling the display device;
wherein the control section sets a luminance level of the neighbouring level of the basic portion and a luminance level of neighbouring portion (- "brightness table generation program 6b" - Fig. 8d and individual levels of R,G,B - Fig. 5); and
the control section controls the display device so that the character and/or graphics are displayed on the display screen (- graphic displaying procedure - Fig. 10) using the set luminance of the basic portion and the set luminance level of the neighbouring portion.

- 3.1a The subject-matter of claim 24 therefore differs from that known from D1 in that: the control section controls the display device in accordance with information related to a viewer of the display device.

The problem to be solved by the present invention may therefore be regarded as overcoming different problems a viewer may have of reading a screen should the viewer suffer from e.g. colour blindness, cataracts, etc.

- 3.1b It is noted however that document D4 which discloses a display apparatus (- Fig. 1) and a corresponding display control method therefor (- Figs. 6A, 6B) also discloses, in common with D1:
- a display screen (- "LCD Display 1" - Figs. 1, 2); and
- a control section for controlling the display device (- 24, 40, 43 - Fig. 2).

Furthermore, D4 discloses:

said control section controls the display device in accordance with information related to a viewer of the display device

- (- "variable font select 24" with "variable font storage 43" - Fig. 2, and
- "displaying text in variable font sizes for the visually impaired individual who would not otherwise comfortably be able to read" - col. 8, lines 1-3).

Accordingly, in light of PCT-Guidelines IV, Chapter IV-8.8, A1(v), the respective subject matters of independent claims 24 and 33 are not considered to involve an inventive step over a non-inventive combination of the teachings of D1 and D4 within the meaning of Article 33(3) PCT.

- 3.2 In addition (- cf. independent claims 40 and 41), insofar as it is well known in the

art to employ LCDs as a display monitor of a computer, any said such computer employing:

- a program for displaying characters and/or graphics; and
- a recording medium, storing such a program,

the respective subject matters of independent claims 40 and 41 are also not considered to involve an inventive step over a non-inventive combination of the teachings of D1 and D4 within the meaning of Article 33(3) PCT.

- 3.3 Dependent claims 25-32 and 34-39 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of inventive step, i.e. see documents D1, D4 and D5 and the corresponding passages cited in the search report. In this respect see:
- D1, particularly in regard to claims 25 and 34, 27-30 and 36-38
(- i.e. see e.g. figs. 1-4 and 9); and
 - D4 and D5, particularly in regard to claims 14, 15, 26, 31, 32 and 39
(- i.e. see D4 - "change font size 88" - Fig. 6A); and
(- i.e. see D5 - "If displays use color coding, then color weakness may be a problem. [...]. Avoid using red and green or yellow and blue in pairs." - page 311, Right Column, last two lines to page 312, Left Column, first two lines).

Accordingly, the respective subject matters of dependent claims 25-32 and 34-39 are not considered to involve an inventive step over a non-inventive combination of the teachings of D1 and D4 or D1 and D5 within the meaning of Article 33(3) PCT.